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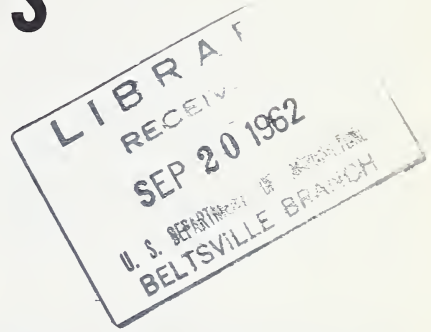
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# Automatic Livestock Waterers



LEAFLET NO. 395

U.S. DEPARTMENT OF AGRICULTURE

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Automatic livestock waterers that are kept ice-free in winter by electric heating elements reduce costs and increase production. They are rapidly replacing watering tanks and troughs on farms in regions where temperatures often go below freezing.

Automatic waterers insure a constant supply of fresh water. They relieve the farmer of the task of hauling or carrying water to livestock. The electric heating elements relieve him of the task of chipping ice out of tanks or tending

some other kind of water heater during freezing weather.

In cooperative tests at the Iowa Agricultural Experiment Station, hogs that drank from automatic waterers gained 10 pounds more per animal in 6 winter weeks than hogs watered twice daily. In other tests by the Iowa station cows that were watered automatically drank 18 percent more water and gave 3.5 percent more milk than cows watered twice daily; moreover, the milk given by the higher-producing cows tested 10.7 percent higher in butterfat.

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# Automatic Livestock Waterers

Automatic, electrically heated livestock waterers are made in many shapes and sizes for all types of livestock. Basically, a unit consists of a water tank fed by pressure or a gravity water system, a float valve, a heating element controlled by a thermostat, and housing to support the tank and exclude outside air movement around the tank.

Common kinds are: (1) General-purpose bowl-type waterers, (2) hog waters, (3) cattle waterers, and (4) combination cattle and hog waterers.

Combination waterers have a tank about 26 inches above ground level for cattle, and a trough at a lower level for hogs.

## SELECTION

Following are points to consider in purchasing an automatic, electrically heated livestock waterer.



BN-15995-X

Hogs drinking from combination waterer.

## Size

Buy the smallest unit that will provide an ample number of watering spaces for your livestock.

Waterers will handle about 30 head of cattle or hogs per watering space if the animals have access to it at all times. When cattle come in from pasture they will all want to drink at one time. Additional watering space can be provided with tanks or waterers not protected against freezing.



BN-15993-X

Cattle waterer installed adjacent to post of loafing shed.

## Heating Element

Select a unit that has the heating element immersed in the tank or one that has the heating element attached to the underside of the tank. These types usually are more efficient than those that warm the space enclosed by the housing.

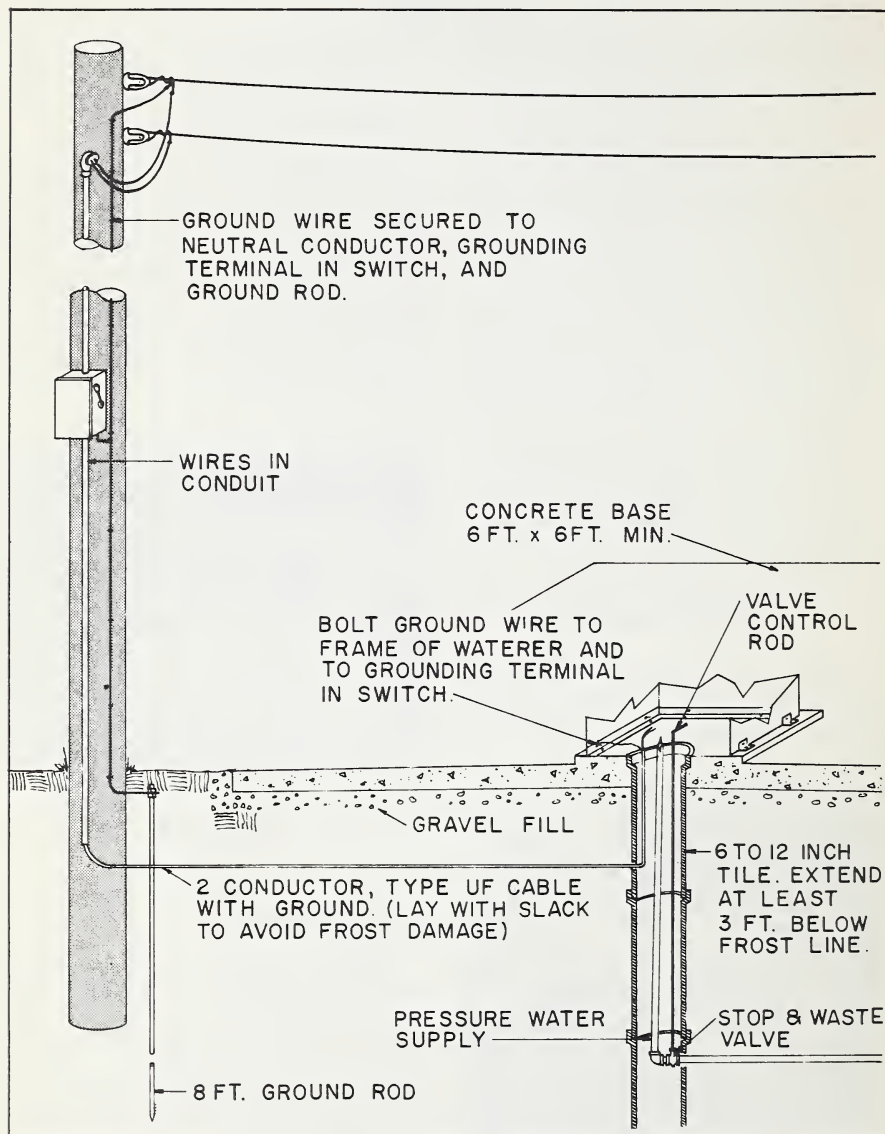
Be sure that the heating element is moisture resistant. If moisture

is drawn into the heating element, it corrodes the resistance wire. Corrosion of this wire is a common cause of heater failure.

Select a unit that has a heating element for each tank of a combination waterer.

## Thermostat

Choose a waterer equipped with a thermostat that has a narrow operating range. A thermostat that has a  $5^{\circ}$  range between the on and off operating points is more efficient



BN-15992-X

Installation details for typical automatic, electrically heated livestock waterer. Service entrance in a convenient building may be used in place of service pole.



BN-15997-X

Hog waterer used for sheep—lid was removed and waterer elevated 3 inches by being set on a concrete base. Wiring conduit is not supported adequately for swine or cattle.

than one that has a 10° range.

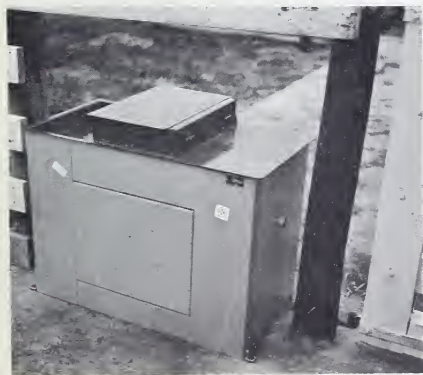
Each of the troughs in a combination waterer should have a thermostat.

## Insulation

Choose a cattle or combination waterer that is insulated with glass wool or other moisture-resistant insulating material. Insulation on the sides of a waterer reduces the amount of electricity used.

## Covers

Choose a cattle waterer equipped



BN-15996-X

Cattle waterer with fold-back lid.

with a cover that can be placed over unneeded drinking spaces. A cover reduces heat loss and the amount of electricity used. A cover on a hog waterer helps keep the water clean and conserves heat.

## Cleaning Aids

Select a waterer that can be cleaned easily—one that is equipped with a drain or a dumping device.



BN-15999-X

Combination cattle and hog waterer with press-down lids over the cattle drinking compartments.

## Safety

Select a waterer with the Underwriters Laboratories (U.L.) label. This label indicates that construction of the waterer meets safety requirements.

## Nonsiphoning

Select a waterer of the non-

siphoning type. With the water inlet above the overflow level of the container, a health hazard cannot be created by contaminated water from the container being sucked back into the supply lines to the pressure tank in the event of a pump or power failure.

Generally, waterers used by Grade A milk producers are required to be of the nonsiphoning type.

## INSTALLATION

Following are points to consider in installing automatic livestock waterers.

### Location

To provide water for animals in two or more lots and to minimize interference with manure cleanup, place the waterer in a fenceline. Install it 25 feet or more from feeders to reduce the amount of feed carried from the feeder and deposited in the waterer.

Waterers in protected locations—back of a windbreak, under a shed, or in a barn—use less electricity than those in the open. But do not place a waterer in shed or barn if it will interfere with manure removal or if it will be in or near a bedded area.

Install the waterer near existing water pipes and electric lines, if possible.

### Base for Waterer

To prevent mudholes near the waterer, mount the waterer on a concrete base not less than 6 feet square. Slope the base away from the waterer at  $\frac{1}{2}$  to 1 inch per foot. Place a coarse gravel fill under and

around the base. A concrete walk from the feeding and resting areas to the waterer is desirable.

## Water Pipes

Install the connecting water pipes below the frostline. Bring the riser pipe to the surface through a 6- to 12-inch tile extending down 3 feet below the frostline. Warm air from below the frostline and from inside the waterer will surround the riser and prevent freezing.

Install a stop-and-waste valve where the water pipe enters the tile if a convenient valve for disconnecting the waterer is not already available.

## Wiring

Be sure the wiring is properly installed and meets all safety requirements. Installation by an electrician and inspection by the power supplier or a wiring inspector are recommended.

The wiring can enter at the side of the waterer if the waterer is installed next to a building or service pole. Be sure a grounding con-



BN-15998-X

Hog waterer with rubble around concrete base to prevent the development of wallows.



BN-15994-X

Wiring in conduit entering cattle waterer from the side.

ductor is present. The conductor usually will be a green-insulated or bare wire; however, the conduit protecting the wires may be used if approved connectors attach the conduit to the waterer and to the switch.

If the waterer is not immediately adjacent to the electrical supply, install the wiring underground. Use type UF direct-burial cable, which consists of two insulated conductors and a bare-wire grounding conductor. The cable can be placed in the same trench with the water pipe.

#### PROTECTION FOR ANIMALS

Place wiring in a metal conduit if it is within reach of animals. Underground wiring should be buried at least 2 feet—even deeper in hog lots. Creosoted or pentatreated boards placed over buried wiring furnish additional protection.

#### FUSING

Use a separate fused circuit for each waterer. Fuse the “hot” wire only. Use a 3- or 5-ampere fuse for hog waterers and a 10- or 15-ampere fuse for cattle waterers and combination waterers. A rule of thumb is to use a fuse having an ampere rating  $1/100$  of the wattage of the heating element when used on 115-volt lines.

#### GROUNDING

Proper grounding of the electrical system, the frame of the waterer, and any conducting material near the waterer—such as stanchions or a wire fence—is necessary to prevent possible injury to animals. For lightning protection, use wood rather than wire fence near waterers.

For grounding you can use (1) a  $3/4$ -inch galvanized iron or steel pipe; (2) a  $5/8$ -inch steel or iron rod; or (3) a  $1/2$ -inch rod of copper or other nonferrous metal. Drive ground rods or pipes 8 feet into the ground. Metallic pipe supplying the waterer will give additional grounding protection; but do not depend upon it as the only ground.

Connect the neutral wire of the electrical system to the grounding rod or pipe with No. 6 or No. 8 copper wire. Bond or connect the grounding terminal in the switch to the ground wire with No. 6 or 8 copper wire. Bonding of the conduit to the ground wire at the top of the pole is required in some States. Attach one end of the ground wire that is with the 2-conductor cable to the frame of the waterer and the other end to the grounding terminal in the switch box.

## OPERATION

Maintain the water temperature no higher than is necessary to prevent surface freezing. This will usually be between 45° and 50° F.

Tests at the agricultural experiment stations in Indiana, Idaho, Nebraska, and Iowa have shown that production is not increased by heating water to a temperature above that necessary to prevent freezing.

To reduce operating costs, turn the switch to the waterer off whenever air temperatures are above freezing. This can be done automatically by a thermostatically controlled cutoff switch that operates on air temperature, or it can be done by hand. If you turn the switch off by hand, be sure to turn it back on when the air temperature drops below freezing.

Be sure the thermostat is operating properly. Check the temperature of the water in the tank occasionally with a dairy thermometer, or a similar one. Make temperature checks on cold days and after no water has been used for about 20 minutes. Adjust thermostat if you find the water temperature is higher than 50° F. If water temperatures fluctuate over a wide range, the contacts on the thermostat are probably worn and are sticking. Replacement of the thermostat may be required.

Keep the water tanks clean. Animals, especially hogs, deposit large amounts of feed in the waterers when drinking. This often leads to fermentation in the water.

## COST

The cost of automatic waterers ranges from about \$40 for small units to more than \$100 for large combination units. The cost of installation depends largely on the distance from the installation to existing water and electric lines. Annual depreciation and maintenance charges are about 10 percent of the cost of the waterer.

The amount of electricity needed to keep a waterer free of ice depends on the size of the waterer, its location and design, severity of the winter, temperature of the incoming water, and the amount of water.

The following shows the amount of electricity used by various types of automatic waterers during a winter season :

<i>Type of waterer</i>	<i>Kilowatt hours</i>
Hog-----	100-300
Cattle-----	500-700
Small combination-----	700-1, 000
Large combination-----	1, 000-2, 000



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